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ABSTRACT

A problem associated with current bottom spin valve designs is that it is difficult to avoid magnetic charge accumulation at the edge of the sensor area, making a coherent spin rotation during sensing difficult to achieve. This problem has been eliminated by introducing an exchange coupling layer between the free layer and the ferromagnetic layer that is used to achieve longitudinal bias for stabilization and by extending the free layer well beyond the sensor area. After all layers have been deposited, the read gap is formed by etching down as far as this layer. Since it is not critical exactly how much of the biasing layers (antiferromagnetic as well as ferromagnetic) are removed, the etching requirements are greatly relaxed. Whatever material remains in the gap is then oxidized thereby providing a capping layer as well as a good interface for specular reflection in the sensor region.